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## NOTICE OF ALLOWANCE AND FEE(S) DUE

26646

7590

05/03/2010

KENYON & KENYON LLP  
ONE BROADWAY  
NEW YORK, NY 10004

EXAMINER

SHEVIN, MARK L.

ART UNIT

PAPER NUMBER

1793

DATE MAILED: 05/03/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,346	10/03/2005	Tadashi Ishikawa	52433/797	7148

TITLE OF INVENTION: METHOD OF PRODUCTION OF METALLIC PRODUCT WITH NANOCRYSTALLIZED SURFACE LAYER

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/03/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

## HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to:** Mail **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
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**Alexandria, Virginia 22313-1450**  
**or Fax** **(571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

26646 7590 05/03/2010

**KENYON & KENYON LLP**  
**ONE BROADWAY**  
**NEW YORK, NY 10004**

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,346	10/03/2005	Tadashi Ishikawa	52433/797	7148

**TITLE OF INVENTION: METHOD OF PRODUCTION OF METALLIC PRODUCT WITH NANOCRYSTALLIZED SURFACE LAYER**

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nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/03/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHEVIN, MARK L.	1793	148-558000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_  
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_  
3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee  
☐ Publication Fee (No small entity discount permitted)  
☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.  
☐ Payment by credit card. Form PTO-2038 is attached.  
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_  
Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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KENYON & KENYON LLP ONE BROADWAY NEW YORK, NY 10004			SHEVIN, MARK L.	
			ART UNIT	PAPER NUMBER

1793

DATE MAILED: 05/03/2010

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 179 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 179 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

# Notice of Allowability

Application No.

10/535,346

Examiner

MARK L. SHEVIN

Applicant(s)

ISHIKAWA ET AL.

Art Unit

1793

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to claims and remarks filed 04/08/2010.
2. ☒ The allowed claim(s) is/are 1-5, 8-10, and 13-21.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All b) ☐ Some\* c) ☐ None of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

/Mark L. Shevin/

/ Roy King/  
Supervisory Patent Examiner, Art Unit 1793

## DETAILED ACTION

### *Status of Claims*

1. Claims 1-5 and 8-14, filed April 8<sup>th</sup>, 2010, are currently under examination. Claims 1 and 14 were amended and claims 6-7 are canceled.

### *Examiner's Amendment*

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Weining Wang on April 26th, 2010.

### *Start of Claim Amendments*

=====

1. (Currently Amended): A method of production of a steel product with a nanocrystallized surface layer,

said method ~~characterized by~~ comprising the steps of:

(1) subjecting a surface layer of a steel product to ultrasonic impact treatment by impacting it at a plurality of different directions and angles using one or more ~~three~~ ultrasonic indenters, wherein said one or more indenters comprise three indenters joined at their tips such that the tips of the ultrasonic indenters vibrate in a plurality of different directions ~~wherein said one or more ultrasonic indenters vibrate in a plurality of~~

~~different angles~~, with said ultrasonic impact treatment of said surface layer providing equiaxial grains in said surface layer, then,

(2) subjecting the surface subjected to the ultrasonic impact treatment to heat treatment at 100° to 500°C for 15 minutes or more to cause precipitation of nanocrystals.

8. (Currently Amended) A method of production of a steel product with a nanocrystallized surface layer as set forth in claim 1, ~~wherein said one or more indenters comprises three ultrasonic indenters, and~~ wherein at least one of the indenters is arranged to provide an incident angle with respect to the surface layer of the steel product of 30 degrees or more.

9. (Currently Amended) A method of production of a steel product with a nanocrystallized surface layer as set forth in claim 1, ~~wherein said one or more indenters comprise three indenters, and~~ wherein the three indenters are arranged at 120 degrees from each other.

11-12. (Canceled)

15. (New): A method of production of a steel product with a nanocrystallized surface layer,

said method comprising the steps of:

(1) subjecting a surface layer of a steel product to ultrasonic impact treatment by impacting it at a plurality of different directions using one or more ultrasonic indenters made to simultaneously vibrate in the vertical direction and the horizontal direction with said ultrasonic impact treatment of said surface layer providing equiaxial grains in said surface layer, then,

(2) subjecting the surface subjected to the ultrasonic impact treatment to heat treatment at 100° to 500°C for 15 minutes or more to cause precipitation of nanocrystals.

16. (New) A method of production of a steel product with a nanocrystallized surface layer as set forth in claim 15, characterized in that said ultrasonic impact treatment produces an amorphous state in said surface layer.

17. (New) A method of production of a steel product with a nanocrystallized surface layer as set forth in claim 15, characterized in that said ultrasonic impact treatment is accompanied with mechanical alloying.

18. (New) A method of production of a steel product with a nanocrystallized surface layer as set forth in claim 15, characterized by making an amorphous phase and a nanocrystal phase copresent in precipitation of said nanocrystals.

19. (New) A method of production of a steel product with a nanocrystallized surface layer as set forth in claim 15, characterized by shielding the surroundings at the time of said ultrasonic impact treatment from air.

20. (New) A method of production of a steel product with a nanocrystallized surface layer as set forth in claim 15, wherein said ultrasonic impact treatment is by impacting said surface at a plurality of different directions using one indenter made to turn or rock.

21. (New) A method of production of a steel product with a nanocrystallized surface layer as set forth in claim 15, wherein a temperature of the ultrasonic impact treatment is made to be a temperature lower than the recrystallization temperature of the steel.

=====

*End of Claim Amendments*

***Allowable Subject Matter***

3. Claims 1-5, 8-10, and 13-21 are allowed.

***Reasons for Allowance***

4. The following is an examiner's statement of reasons for allowance:

The closest prior art of Statnikov, Lu, and Wang disclose producing amorphous white layers on the surface of metallic products including steel by impacting the surface with an ultrasonic indenter. However, with respect to independent claim 1 of the present Examiner's amendments, none of the cited references discloses a method featuring the require three indenter configuration joined at their tips.

Furthermore, with respect to new independent claim 15 of the present Examiner's amendments, Statnikov's ultrasonic indenter tool only causes the indenters to vibrate in the vertical direction (Statnikov - para 0041-0046 and Figure 1), which is insufficient to cause the formation of equiaxial grains (Specification - p. 6, lines 15-20), whereas the indenters of instant claim 15 are caused to simultaneously vibrate in the vertical direction and the horizontal direction to form equiaxial grains (Specification - p. 9, lines 3-7).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

***/Mark L. Shevin/***  
Examiner, Art Unit 1793

***/ Roy King/***  
Supervisory Patent Examiner, Art Unit 1793

10-535,346  
April 26<sup>th</sup>, 2010